

EDITORIAL ARTICLES.

LORENZ ON THE BLOODY REPOSITION OF CONGENITAL HIP-JOINT DISLOCATION.¹

THE first efforts in the direction of the rational treatment of congenital dislocation of the hip were made by Pravaz and Jacquier in 1830. Their efforts were analogous to the treatment of traumatic dislocation, and had as an object the replacing of the dislocated head of the femur into the natural acetabular cavity.

There were two difficulties to be overcome in accomplishing the desired end: the head of the femur, which was dislocated backward and upward, could not in the case of older children be brought down to the level of the acetabulum. The cause of this rested in the shortening of the soft parts, especially the muscles. They sought to overcome this difficulty by mechanical extension. Pravaz obtained unquestionable results in this direction by the use of his persistent and tedious extension appliances. The second difficulty encountered lay in the rudimentary development of the joint-pan, which was entirely too small to receive the head of the femur. All attempts to correct this disproportion of the parts of the joint have been without satisfactory result even up to the most recent time, so that this has still to be regarded as an incurable condition.

Lorenz does not enter into the consideration of the mechanical non-operative methods which have been practised for the correction of this disease; nor does he enter into the numerous operative measures which have been practised with the view of solidly fixing the head of the bone in its pathological position; but devotes himself entirely to the original plan of Pravaz of reducing the dislocated

¹ Sammlung klinischer Vorträge, No. 117, 1895.

head back into a normally located artificial pan. To the Italian, Magary, belongs the credit of first replacing the dislocated bone into the artificially enlarged pan. His effort was unsuccessful, and he resected the head of the femur. The first successful operation was performed by a student of Loreta, in Bologna (Alfonzo Poggi, January 29, 1888), who succeeded in making an acetabulum in the normal location, replacing the head of the thigh-bone and keeping it in position. Poggi found that the obstacle to the bringing down of the head was in the shortened gluteal muscles. His case was that of a twelve-year-old girl. He carried a semicircular incision about the greater trochanter, which extended down to the capsular ligament and divided transversely the gluteal muscles. After splitting open the hour-glass-shaped capsule, the pan was made accessible, and after turning the head out through the wound by strong flexion and adduction of the thigh, the rudimentary pan was artificially deepened. The reposition of the head was then accomplished by strong extension. Thirteen months after the operation there was a good functional result.

Poggi did not elaborate his method, and it remained for Hoffa, of Würzburg, to perfect the operation for replacing the head in its normal position and retaining it as a normal joint.

Hoffa was the first to point out a method for bringing down the head to the level of the pan in all cases, and thereby accomplishing one of the most important conditions in the operation. The construction of an artificial pan, which in itself was no difficult task, and which had been often theretofore accomplished, had to be regarded as wasted pains, because there was no certainty that the head of the bone would remain in it.

The process of theoretical reasoning upon which Hoffa based his method of reduction was to the effect that the muscles about the hip-joint, as a result of the dislocation of the thigh, undergo a nutritive shortening, whereby the obstruction to the reposition is brought about. At the same time he assumed that there is a nutritive contracting of the soft parts, consisting of the long muscles passing from

the pelvis to the thigh and leg. It is upon this ground that he accomplishes reduction by a subperiosteal division of the muscles inserted into the two trochanters.

The theory of the muscular shortening advanced by Hoffa is founded upon the older theory of Brodhurst, which places the cause in the shortening of the pelvi-trochanteric muscles. In virtue of the accentuation of the nutritive shortening of both the pelvi-femoral and pelvi-tibial muscles, Hoffa enlarged upon the old theory of Brodhurst, and constructed a new theory upon which he based his operation.

The operation of Hoffa at the present time is as follows: In children of six years or over the opening of the joint is preceded by subcutaneous or open division of the soft parts on the anterior, inner, and posterior sides of the hip-joint. With the knee extended, and the hip flexed as much as possible, the muscles springing from the tuber ischii are divided subcutaneously. The leg is then brought down and the adductors divided in the same manner. Under strong hyperextension of the hip the soft parts thus rendered tense are divided on the anterior aspect of the joint by an open incision carried down as far as the joint capsule. After these extensive divisions of the soft parts, if any bands still remain tense, they should be cut. These wounds are then protected, and the joint itself opened. This is done by the Langenbeck resection incision, which is carried as nearly as possible parallel with the muscles and vessels, and exposes the posterior surface of the joint capsule. The capsule is opened by an incision parallel to the skin incision. A probe-pointed knife is then passed into the wound, and all of the muscles are separated subperiostially from their insertion into the great trochanter. At the same time the tendon of the ilio-psoas muscle is separated from its insertion into the lesser trochanter, and the whole upper end of the femur, as far below the lesser trochanter as possible, is freed of its soft tissue by means of the raspatorium.

By this means the head of the femur is rendered so movable that with the help of strong flexion and adduction of the leg the entire

denuded end of the bone can be brought out through the wound and held by a strip of iodoform gauze, while the scraping out of the acetabulum is easily practised with the bayonet curette. When the pan is situated at the fundus of the wound cavity the spoon can be guided in by the index-finger. Care should be taken to make the borders of the new pan as sharp as possible.

In the case of young children under five years of age Hoffa omits the preliminary division of the soft tissues described above, and begins the operation by first opening the joint cavity, and then the upper end of the femur is stripped of its muscular connections through the wound. The head of the femur allows itself in these cases to be brought into the acetabulum by direct pressure with flexion of the thigh, and the long muscles are gradually stretched by slow and methodical extension of the knee-joint and hip.

After complete reposition has been accomplished the superfluous portion of the capsule is cut away and the wound stuffed with iodoform gauze. Hoffa places small children upon a Phelps standing-bed; larger children are put up with extension. They are kept in bed for four or six weeks after the operation. After double operations a corset is applied, after single operations a cuirasse splint is used in walking.

At the time of the appearance of the second edition of his textbook, Hoffa had done the operation on fifty-four patients, seventy-five times during a period of five years, forty-four times on both sides, and thirty-one times on one side.

Of these fifty-four patients five died. Two of the deaths were not directly due to the operation, one child dying of influenza-pneumonia fourteen days after the operation, and the other of intestinal catarrh at the end of three weeks.

Three deaths occurred in immediate connection with the operation. Hoffa attributed these deaths to the great loss of blood, operation-shock, the results of prolonged narcosis in cases of unusually long operations, and iodoform intoxication.

Hoffa recommends the bloody reposition only in children before

the tenth year. After this age he recommends, especially in double-sided cases, the formation of a pseudo-arthritis.

A detailed account of all his operated cases has not yet appeared. At the Nineteenth and Twenty-second German Surgical Congress he reported one double and two single cases in which most excellent results were obtained.

M. Schede¹ has reported four cases of bloody reposition of congenital hip-dislocation, and slightly modified Hoffa's method of operating. For the purpose of facilitating the reduction of the head of the femur, Schede recommended extension up to ten pounds for several weeks.

Karewski entertained a very pessimistic view of the results to be obtained in the operative treatment of congenital hip-dislocation especially when a secondary joint had been formed. He endeavored to form a resisting wall by driving nails into the posterior border of the acetabulum and leaving them there for six or eight days.

According to a communication from Joachimsthal,² J. Wolff has had to give up the Hoffa operation and limit himself to simple mechanical treatment.

At the last German Surgical Congress, Twenty-third, there was a very marked dissension on the question. Karewski warned the surgeon against an over-estimation of the operation, especially in cases in which the anatomical conditions were not so favorable as in those cases operated upon by Hoffa and Lorenz.

Von Bergmann recommended the mechanical treatment by splint apparatus, as he had had suppuration in two of his operated cases. Tillmanns had also obtained poor results with the Hoffa method, and attributed the trouble to unfavorable conditions between the neck and shaft of the femur. Only Bramann championed the operation, which he had done in fourteen cases, many of which were severe, with good result.

In France, Hoffa's operation has been followed by Kirmisson.³

¹ Langenbeck's Archiv, 1892.

² Berliner klinische Wochenschrift, 1891, No. 15.

³ Revue d'Orthopédie, March, 1893.

His results are not very encouraging. Among seven of his operations is but one satisfactory result. Scarcely any were without reaction; there was a pronounced local disturbance in three cases; and one death resulted twenty-six hours after operation from shock, hæmorrhage, or septic peritonitis.

From these experiences Kirmisson has come to regard Hoffa's operation as a very serious thing. In every case he perforated the pelvis while scooping out the acetabular pan, and thus greatly increased the danger of the operation.

Lorenz himself has hesitated a long time over the operation of Hoffa, and has performed it but once, upon a seven-year-old girl.¹ In that case it was shown that the head of the femur, even after the greatest possible denuding of the upper end of the bone, could only by very great traction be moved from its pathological situation.

Lorenz assumed, from this experience, that the soft parts inserted into the greater and lesser trochanters and in the intertrochanteric space, as well as the pelvi-trochanteric muscles, acted in nowise as an obstruction to the drawing down of the head of the femur, as Hoffa believes. To prove this, Lorenz shows that with the pelvis fixed when extension is made upon the dislocated leg the soft parts over the larger trochanter, as far as can be determined by palpation, remain relaxed and are evidently no obstruction to the reposition of the head of the bone.

By a closer study of the myopathology of congenital hip-joint dislocation, Lorenz has evolved certain principles.² These are briefly as follows:

(1) The pelvi-trochanteric muscles (glutæus medius, minimus, pyriformis, obturator internus, gemelli, obturator externus, quadratus femoris, and ilio-psoas) do not undergo a shortening in congenital dislocation of the hip, but, on the contrary, they became elongated, and, therefore, do not offer any obstacle to the drawing down of the head of the bone.

¹ Centralblatt für Chirurgie, 1892, No. 31.

² Wiener klinische Wochenschrift, 1894, Nos. 11-13.

(2) The pelvi-femoral muscles (*glutæus maximus* and the adductor group) undergo a general shortening. This shortening really involves only the median portion of the adductor magnus and in a lesser degree the adductor longus, which are inserted into the lower end of the diaphysis of the femur, while all the other fibres of the adductor group undergo an elongation.

(3) The pelvi-crural muscles (*sartorius*, *tensor fasciæ latæ*, *rectus cruris*, the other anterior muscles, *gracilis* on the inner side, and the three muscles inserted into the *tuber ossis ischii*, *semimembranosus*, *semitendinosus*, and *biceps femoris* on the posterior side of the thigh) undergo a shortening in ratio with the degree of the dislocation of the femoral head, and form the only muscular obstruction to reduction of any importance.

Lorenz based a plan of operation upon these pathologico-anatomical facts, which he first carried into effect in May, 1892, in the clinic of Professor Albert. Soon after this he published a report¹ of the method based upon four cases.

The principle of his method of reduction rests, contrary to Hoffa's method, in the unconditional preservation of the muscles inserted into the larger and smaller trochanters.

The division of the pelvi-trochanteric muscles he considers superfluous, for, by virtue of their lengthening, they do not prevent reduction, and their division from their attachment does a lasting damage to the function of the muscles, and is an entirely unnecessary procedure. Of all the muscles about the hip-joint the pelvi-trochanteric are more protected from atrophy in congenital dislocation, on account of the dragging upon them of the weight of the body, than are the pelvi-femoral and pelvi-crural muscles. A most perfectly normal action of the pelvi-trochanteric muscles in the intact hip-joint is of the utmost importance for a normal gait, for they perform the function of holding the pelvis firmly against the femur when it is supporting the weight of the body.

An imperfect fixation of the pelvis against the supporting femur

¹ *Centralblatt für Chirurgie*, 1892, No. 31.

would in all cases give rise to a more pronounced sinking of that side of the pelvis. At the moment of stepping on the right leg, supposing an insufficiency of the right pelvi-trochanteric muscles, the left half of the pelvis would be abnormally strongly depressed.

In case of hip-luxation the abnormally-strong contralateral depression of the pelvis during the act of bearing the body-weight on the diseased leg is a very characteristic feature of the peculiar gait, and contributes to the impression of general sinking of the whole body when the dislocated leg is stepped upon. After complete reduction of the head this symptom remains. The children which are operated upon, and in whom a perfectly satisfactory reduction has been accomplished, still have a limping gait. This persistent limp remains so long as the insufficiency of the pelvi-trochanteric muscles cannot be remedied.

The preserving intact of the pelvi-trochanteric muscles is, therefore, a chief desideratum in all operative therapy, in cases, also, in which these muscles are contracted. Their division should not be practised even when they are shortened. Their preservation becomes more important with the degree of defect in the gait.

Further pursuit of this idea shows that conjointly with the preservation of the pelvi-trochanteric muscles the preservation of all the other hip-joint muscles is indispensable for arriving at the best results.

In severe cases the flexor muscles must be preserved under all circumstances, in order not to impair the later flexing function, and to avoid the tendency to flexure contracture.

Furthermore, Lorenz insists that in children six and seven years of age and over, with more than three centimetres of irreducible shortening, an absolute immunity must be given to the tuberosity muscles, notwithstanding their contracting, out of consideration to the ischiadic nerve.

The disregarding of this rule has in many such cases, with constant regularity, been the cause of neuralgias of the ischiadic, and, indeed, of paralysis of the leg.

It can be positively asserted that the paralysis of the muscles of

the foot, after tenotomy of the ham-strings, is in nowise due to injury to the nerves, but is the result of dragging upon the ischiadic nerve, which is done by the extension of the leg after division of the tendons. By preserving the tuberosity muscles intact and practising gradual extension, the ischiadic nerve is not subjected to the danger of sudden stretching, and the desired result can be accomplished with absolute certainty.

It is an interesting fact that in the beginning of his operative repositions Lorenz had no disturbances of the ischiadic nerve after separating the ham-string muscles from their attachment to the ischium. This is evidently preferable to cutting the tendons behind the knee, as Hoffa recommends. This is explained by the simple fact that in the high operation the continuity of the muscles attached to the ischium is not entirely destroyed, some fibres still remaining, and thus the great sciatic nerve does not entirely lose its muscular protection. In young children with slight and non-resisting shortening, the tenotomy of the posterior thigh muscles does not cause any disturbance in the ischiadic nerve wherever it is done; and in these cases it is *eo ipso* unnecessary.

It has been Lorenz's endeavor during the last two and a half years to do away as much as possible with the division of muscles in the 140 cases in which such operation might have been practised, and finally he has arrived at his present method of reduction, which is characterized by the absolute preservation of the continuity of the muscles.

Lorenz divides the cases into three classes:

(1) Those in which the head of the femur can be easily brought down into the pan of the acetabulum in children from three to five years of age.

(2) Cases of moderate severity in children from six to eight years.

(3) The more severe cases between nine and twelve years and upward.

(1) In the lightest cases an assistant grasps the dislocated leg

above the knee and makes moderate extension with the leg slightly abducted without any contra-extension against the perineum. An incision six to eight centimetres long is carried from the anterior superior spine of the ilium along the outer border of the tensor fasciæ muscle downward and outward. The fascia lata is divided from the spine downward along the outer border of the tensor fasciæ muscle, backward along the anterior border of the glutæus medius muscle, and the tensor fasciæ latae with the overlying sartorius and the underlying rectus cruris are drawn forward. The anterior capsule of the joint is then exposed by blunt dissection. The transverse separation of the fascia lata from the wound outward allows the head to be brought down by moderately strong extension. The capsule is then divided, the pan gouged out, and the head repositied. This is practically what is done also in the more severe cases.

In this operation the head is reduced into its normal place without cutting a single muscle about the hip-joint.

(2) In cases of the second class, in which the ordinary methods of extension do not bring the head down into place, the same principle of preservation of the muscles is to be observed.

The anterior capsule is exposed in the same manner as above described. As an aid to reduction, Lorenz uses in this class of cases a band thrown around the leg, upon which two assistants make extension in a slightly abducted direction, while counter-extension is made by a perineal band. The capsule is then opened and the head drawn down to its normal level.

Lorenz uses in especially difficult cases a screw arrangement at the foot of the table around which the extension bandage is passed, and traction is made by gradually winding up the bandage which is fixed about the leg. In using such an apparatus it is important that the extension be made very gradually. By this means it is possible to accomplish reposition in severe cases without dividing a muscle.

(3) In cases of the third category, with marked shortening and very slight downward movability of the head, it is necessary to precede the operation by a period of treatment with extension. This

may be accomplished by an extension of thirty pounds for not more than fourteen days.

The effect of this is often not very evident, and the chief work has to be done at the time of operation with the extension screw. Lorenz has been able to manage the most difficult cases in this manner without sacrificing a muscle.

As soon as reduction is accomplished the capsule is opened by a liberal cross incision. One arm of the cross reaches from the spina ilii anterior inferior to about the middle of the linea intertrochanterica anterior, and corresponds with the direction of the neck of the femur. The other arm of the cross is nearly at right angles to the first, and extends from the region of the front inner border of the rudimentary pan to above the level of the upper pole of the head of the femur. The ligamentum teres should be extirpated.

The opening of the joint is followed by the gouging out of the pan. In order to render the pan more accessible the head is lifted out of the way by slight flexion, abduction, and elevation of the femur, while the anterior muscles (tensor, sartorius, rectus, and ilio-psoas) are strongly retracted inward by a blunt retractor.

Through this opening the rudimentary pan is reached by the index-finger along which a sharp spoon is guided, and the cartilaginous floor of the same is scraped out. The *modus procedendi*, of course, varies with the case, but the idea is to make as deep and normally shaped an excavation as possible to receive and retain the dislocated head. Herein lies the art and the difficulty of the whole operation.

Great pains must be taken to make a good excavation and a sharp upper border to the same. As the act of cutting out the pan is a very bloody operation, it is advised, when both sides are operated upon at one sitting, to make the operation as rapidly as possible. A perforation of the wall of the pelvis in making the pan is, as a rule, entirely unnecessary.

When a satisfactory acetabulum has been made, the last act of the operation follows,—namely, the reposition of the head of the femur

into the artificial pan. When it has been found beforehand that the head can be brought down to the proper level, there is usually no difficulty encountered in fitting it into the new cavity by simple extension, provided that no tissue falls between to prevent reduction. As a rule, it is necessary to make some little improvements in the pan after testing the fit of the head in it, until the head fits firmly in its new cavity. The operation may be regarded as satisfactory when the bone remains in place with the leg lying out straight, or when it is slightly adducted.

The capsule should be brought together, but not sewed. The skin wound, with the exception of a small central point, is then closed with sutures. Aseptic dressing is applied, and the leg is fixed in a position of light abduction by a plaster bandage extending from the axilla to the malleoli.

In the case of young children, Lorenz has completed the entire operation in from ten to fifteen minutes. Double-sided luxations in young children from four to seven years of age he corrects at one sitting. The plaster bandage in such cases is made to include both legs, which are lightly abducted.

The after-treatment consists in the absolute rest of the muscles and joint. On the fifth or sixth day the children are usually allowed out of bed. An elevation can be placed under the sound foot. On the tenth day the dressing is renewed. In the course of the fourth week the entire fixation bandage is removed, and the wound which should be nothing more than a superficial granulation is simply protected with a gauze bandage. Gymnastics and massage of the leg are then begun. The gymnastics consists in very careful and slight passive flexion, extension, and abduction of the leg, and their combinations. The movements of abduction and the massage of the muscles of the buttock are of the greatest importance. When it is seen how quickly these children regain the use of their legs, the value of preserving the muscles is very evident. In the sixth week the patient is, as a rule, able to walk alone or with the assistance of another. Lorenz has entirely given up every sort of apparatus for after-treatment.

If the head of the femur is in fairly good condition, and the reposition has been exact, a backward relaxation need not be feared; for such an accident is prevented by the overhanging border of the pan, the scar and the air-pressure, and the abducted position of the thigh during healing, strongly prevents such an accident.

Great care should be taken to prevent subsequent contracture malposition. Especially is the tendency to flexo-adduction to be guarded against by strong, passive motion in the opposite directions. The further treatment consists in energetic walking without assistance.

This operation, of course, gives the best chances when done during the first ten years of the child's life. In cases in which the head of the femur is in good condition the operation can be carried out in adolescence. The oldest patient operated upon by Lorenz was twenty years of age. As a limit for the double-sided operation he fixes the age of ten years.

As to the results to be attained by this operation, a completely normal function of the joint, the absolute integrity of the joint-parts, and the joint-musculature is to be expected. In the strict sense of the word, this is not completely accomplished. It is clear that the newly-constructed joint, by virtue of the incongruence in the two coapted parts, the imperfection of the pan, the distortion of the femoral head and neck, the misfit capsule, etc., is only an imperfect substitute for the normal hip-joint.

In the course of further use these conditions become improved. The surface of the pan becomes covered, as Hoffa has shown, with a layer of fibro-cartilaginous tissue, whereby the motion between the head and the pan is more smooth, and there is a better congruence between the two. The capsule also becomes more normal, so that an excursion of 90° can be made in an antero-posterior plane, and a satisfactory abduction can be accomplished. On account of the deformity of the upper end of the femur and danger of relaxation, any increase in the excursion of the leg should not be striven for. A nearly normal anatomical condition of the joint is possible if the limits of motion are thus confined.

However perfect in an anatomical sense, the result of the operation may be a perfect functional result, as shown in a regular and normal gait, is not to be expected. Notwithstanding a perfect reposition, the gait of the child remains usually a limping one. This limp, however, has a very different character from the luxation limp, and is due to the imperfect fixation by the muscles at the moment the weight comes upon the affected side.

The functional result of the reposition is, therefore, finally dependent upon the degree of muscular insufficiency, and this explains why the gait remains so long imperfect. This fact emphasizes the necessity for preserving the muscles, and especially those of the pelvi-trochanteric group.

Of course, after the reposition, it cannot be expected that the legs will be of equal length, because of the shortening from the anomalous growth of the upper end of the femur. The shortening can vary from a few millimetres to two centimetres,—rarely more. This can easily be remedied by a lift under the foot.

When, as a result of the reposition-operation, complete ankylosis of the hip-joint occurs, it is a fact that it is possible for the functional result, as shown in the gait of the child, to be incomparably better than with a movable joint with muscular insufficiency.

Lorenz gives a summary of the first hundred cases operated upon by him after his method since May, 1892. The cases can be divided into two groups, as they were treated under entirely different circumstances. The first twelve cases constitute a group which were operated upon by Lorenz in Albert's clinic. These operations were done while the operation was still in an experimental stage, and under conditions very unfavorable for asepsis. As a result there was an uninterrupted series of bad results. One reposition was left unfinished because of the imperfection of the technique. (This case was operated upon twenty-seven months later, when the child was thirteen years old, and a perfect result obtained without dividing a muscle.) In another case suppuration with subsequent luxation took place. The first double-sided case operated upon developed mild suppuration in

both sides, with subsequent ankylosis of both hips, in a slightly flexed position. Relaxation occurred in two cases as a result of pathological anteversion of the femoral head. Once the reposition was very difficult, because the upper end of the femur resembled very much that of the humerus, and was only possible under strong abduction. The result in three cases was bad, because after-treatment could not be carried out. This list of bad results was finally followed by two cases which, after perfectly smooth operations, died, one after another, from very acute sepsis.

With such results Lorenz could not continue his work in the clinic of Albert, and so he moved the seat of his operations to the private hospital of Dr. Eder. Here he did his first hundred repositions without a single death. The cases, with but a single exception, healed without reaction; and in this case, though ankylosis occurred, an excellent gait was the result. In three other cases, notwithstanding uncomplicated healing, the motion in the operated joints was very limited, and the results were only fairly good.

The question as to whether the head always remains in its place, Lorenz is able to answer from his experience that only in two operated cases, as a result of a too tardy correction of adduction, did a posterior relaxation of the thigh take place.

Out of the 100 cases of reposition, in eleven cases a relaxation of the head forward under the anterior superior spine of the ilium was observed. This condition always occurred very early during the period of healing of the wound. In these cases there was always a pathological anteversion of the head of the thigh-bone, and the relaxation is to be regarded as a necessary mechanical result of this condition. Cases of this sort had better be excluded from operative interference entirely.

The anterior dislocation is not to be regarded as a complete failure of the operation, for with the head on the anterior border of the wing of the pelvis beneath the spina ilium anterior superior it has a bony support, which gives it a stationary position, and greatly improves the limping gait.

With these thirteen cases excluded, all of the others have fulfilled as nearly as possible the possibilities of the operation. The complete cure of the limp must depend on the measure of the restoration of the muscular strength. This is quite entirely a question of muscular restitution. Lorenz has always observed that the slight limp after the operation in all cases becomes less month after month; and in every child which was submitted to operation, between one and two years of age, the limp is reduced to such a minimal degree that it is quite impossible to tell upon which leg the operation was done. Such cases were presented by Lorenz before the K. K. Gesellschaft der Aerzte in Wien, and the Surgical Section of the Thirteenth International Congress in Rome. He presented a series of thirty-four operated children, of whom five were double-sided cases, before the Surgical Section of the sixty-sixth *Versammlung deutscher Naturforscher und Aerzte* in Wien, and the results were highly complimented.

Lorenz expresses his satisfaction that he has been able to demonstrate upon a mass of material, which for size and richness has as yet not been equalled, that the congenital hip-joint dislocation is accessible to an operation which is practically without danger, and which, under favorable anatomical conditions, promises an almost complete cure of the disease.

Hoffa has repeatedly alluded to the method of Lorenz as a modification of his operation. This is certainly not the case. The theoretical foundation of Hoffa's operation rests upon the idea that the muscles are contracted, especially the pelvi-trochanteric group, and that there is a general shortening of all of the muscles about the joint.

The method of Lorenz, on the other hand, is founded upon the fact that pelvi-trochanteric muscles are lengthened, and therefore cannot be a hinderance to reduction, and on this ground and on the ground of their functional importance must not be divided. The only muscles, according to Lorenz, which are shortened and which hinder reduction are the pelvi-crural and, partially, the pelvi-femoral muscles. The basis of Hoffa's method is not only very different from

that of Lorenz, but in a large part of its pathologico-anatomical principles is diametrically different. This is seen in the practical application of the two methods.

The preservation of the insertion of the pelvi-trochanteric muscles necessitates the anterior opening of the joint in Lorenz's method, while the supposed necessity of division of all of these muscles in Hoffa's method makes the resection-incision of Langenbeck necessary.

Hoffa's method is characterized by denuding the upper end of the femur of its muscular attachments; Lorenz's method by the absolute preservation of all of the muscles inserted into the upper end of the femur. Another difference between the two methods is that Hoffa, in severe cases, does not spare any of the muscles which move the hip-joint.

In order to show more clearly the difference between the two methods the following figures may be consulted: In a mild case, in a child under five years of age, Hoffa sacrifices, under all circumstances, at least ten muscular insertions, while Lorenz does not divide a single muscle. In considering the question of muscular division, then, the relation of the method of Lorenz to the method of Hoffa is 0:10. In a double-sided case this relation would become 0:20.

If we take, for example, a very difficult case of the third category (a nine to twelve-year-old child), the method of Lorenz accomplishes a reduction of the head with the division of not more than two adductor muscles, whereas the method of Hoffa would sacrifice not less than eighteen muscles. With the exception of the middle adductor group, Hoffa would sacrifice every muscle connecting the leg with the pelvis. In such a case the muscle-preservation ratio would be 2:18; and in such a double case, 4:36.

Another difference between the two methods is in the act of opening the capsule. Hoffa's method costs the capsule its femoral insertion; the method of Lorenz leaves the insertion of the capsule completely intact and opens the joint by simply splitting the capsule.

A further difference between the two operations is the extent of operative division of tissues. In this the operations differ widely.

This fact is of great importance, for upon the extent of injury to the tissues depends the immediate danger of the operation. Inasmuch as the reposition of the congenital hip-dislocation belongs to the cosmetic operations, the greater or lesser danger of the operation is a very important moment.

Up to the present time the literature contains reports of four deaths, which occurred immediately at the close of Hoffa's operation from shock, acute anæmia, long duration of narcosis, intoxication from antiseptics, etc. Hoffa himself had, in seventy-five operations, three deaths immediately after the operation.

A very different picture is that of Lorenz's operations, done at the private hospital of Dr. Eder, in Vienna, which, out of 100 operated cases, shows no deaths and ninety-nine healing without reaction. On the ground of these facts Lorenz claims that under aseptic precautions his operation may be said to be without danger.

As a student under Lorenz, it was the privilege of the writer to witness his early struggles with congenital hip-joint dislocation. Any better results than he obtained in his first twelve cases operated upon in Albert's clinic, would have been nothing short of marvellous. The wonder was that he dared to venture upon such grave operations surrounded by such unfavorable conditions as prevailed in Albert's cramped quarters at that time. Since 1892, the operations which he has been able to do in Eder's operating-room, show that the early failures were not wholly due to faults in the technique.

JAMES P. WARBASSE.